

REMARKS

Prior to the present amendment, claims 1-52 were pending. By this amendment, claims 1, 12, 25, 39, and 41 have been amended. Accordingly, claims 1-7, 10, 12-52 are currently pending.

Rejection under 35 U.S.C. 102(b)/103(a) over U.S. Patent No. 5,902,562 to Lagasse

Claims 1-10 were rejected under 35 U.S.C. 102(b) for allegedly being anticipated by, or in the alternative, under 35 U.S.C. 103(a) for allegedly being obvious over U.S. Patent No. 5,902,562 to Lagasse. The office action states that Lagasse teaches, especially in figs. 1 and 3, what appears to be the claimed invention.

Applicants respectfully disagree. Lagasse discloses a method for preparing PVDC carbons. The PVDC carbons taught in Lagasse possess a substantial volume of pores with a width smaller than 1 nm, but **no mesoporosity**. See column 6, lines 43-45.

In stark contrast to Lagasse, the claimed invention is directed to carbon monoliths containing mesopores and macropores. Accordingly, the claimed invention cannot be said to be anticipated or obvious over Lagasse.

Therefore, applicants respectfully request that the rejection of claims 1-10 under 35 U.S.C. 102(b)/103(a) over Lagasse be reconsidered and withdrawn.

Rejection under 35 U.S.C. 102(b)/103(a) over Taguchi

Claims 1-10 were rejected under 35 U.S.C. 102(b) for allegedly being anticipated by, or in the alternative, under 35 U.S.C. 103(a) for allegedly being obvious over Taguchi et al., *Adv. Mater.*, 2003, 15:1209-1211. The office action states that Taguchi et al. teaches a porous carbon monolith containing mesopores and macropores. The examiner

asserts that no difference is seen between the carbon monolith disclosed in Taguchi et al. and the claimed monolith.

Applicants respectfully disagree. Taguchi et al. discloses that the carbon monolith undergoes structural collapse under an electron beam at higher TEM magnification. See page 1210, lines 11-13 of Taguchi et al. Therefore, there is no disclosure or suggestion in Taguchi et al. of a robust carbon monolith. In stark contrast to Taguchi et al., the claimed invention requires that the carbon monolith be robust. Accordingly, the claimed invention cannot be said to be anticipated or obvious over Taguchi et al.

To further distinguish the claimed carbon monolith from the carbon monolith disclosed in Taguchi et al., applicants have amended the claims to require that the claimed robust carbon monolith does not undergo structural collapse at 525,000 times TEM magnification. Support for the amendment can be found in the specification as originally filed, see *inter alia*, paragraph [0044] on page 6 and figure 16. Applicants further submit a Rule 132 Declaration executed by Chengdu Liu, a co-inventor of the instant application. In the Liu Rule 132 Declaration, Dr Liu states that the formula for calculating magnification is well know to those of ordinary skill in the art. See paragraph 6 of the Liu Declaration. Using the formula, and figure 16 of the application, Dr. Liu calculates that the carbon monolith in figure 16 is magnified 525,000 times. See paragraphs 9 and 10 of the Liu Rule 132 Declaration. Figure 16 also shows that the carbon monolith is not collapsed.

In stark contrast, the carbon monolith of Taguchi et al. undergoes structural collapse at 525,000 times TEM magnification. Taguchi et al. shows a TEM image of the carbon monolith in figure 3. Taguchi et al. further states that “A more detailed TEM study was **not possible, due to structural collapse of the carbon under the electron**

beam at higher magnification. (*Emphasis Added*)” See page 1210, lines 11-13 of Taguchi et al.

The magnification of figure 3 is calculated to be 50,000 times TEM magnification. See paragraphs 7 and 8 of the Rule 132 Declaration of Taguchi et al. Therefore, the carbon monolith undergoes structural collapse of TEM magnification higher than 50,000 times. Accordingly, Taguchi et al. does not disclose or suggest a robust carbon monolith which does not undergo structural collapse at 525,000 times TEM magnification.

For the above reasons, applicants respectfully request that the rejection of claims 1-10 under 35 U.S.C. 102(b)/103(a) over Taguchi et al. be reconsidered and withdrawn.

Rejection under 35 U.S.C. 102(b)/103(a) over Polarz

Claims 1-10 were rejected under 35 U.S.C. 102(b) for allegedly being anticipated by, or in the alternative, under 35 U.S.C. 103(a) for allegedly being obvious over Polarz et al., *Chem. Mater.*, 2002, 14:2940-2945. The office action states that Polarz et al. teaches a carbon material containing mesopores and macropores. The examiner asserts that no difference is seen between the carbon monolith disclosed in Polarz et al. and the claimed monolith.

Applicants respectfully disagree. Polarz et al. discloses a carbon monolith containing macropores with a polydisperse pore size distribution ranging from about 20-200 μm . See the sentence bridging pages 2943 and 2944 of Polarz et al. There is no disclosure or suggestion in Polarz et al. of a carbon monolith containing essentially uniform sized macropores.

In stark contrast to Polarz et al., the claimed invention, as amended, requires that the carbon monolith contain essentially uniform sized macropores. Support for the

amendment can be found in the specification, see *inter alia*, figures 9-14, and their accompanying figures legends. The figures show the claimed carbon monolith having essentially uniform sized macropores. For example, figure 14 is a photomicrograph showing a carbon monolith containing approximately 20 μm macropores.

Accordingly, the claimed invention cannot be said to be anticipated or obvious over Polarz et al. Therefore, applicants respectfully request that the rejection of claims 1-10 under 35 U.S.C. 102(b)/103(a) over Polarz et al. be reconsidered and withdrawn.

Rejection under 35 U.S.C. 102(b)/103(a) over U.S. Patent No. 6,024,899 to Peng et al.

Claims 1-10 were rejected under 35 U.S.C. 102(b) for allegedly being anticipated by, or in the alternative, under 35 U.S.C. 103(a) for allegedly being obvious over U.S. Patent No. 6,024,899 to Peng et al. The office action states that Peng et al. teaches mesoporous carbon made using porogens. The examiner acknowledges that micropores are not described. However, the examiner contends that macropores account for the remaining pore volume.

Applicants respectfully disagree. Nowhere in Peng et al. is there any disclosure or suggestion of a carbon material containing essentially uniform sized macropores. In contrast to Peng et al., the claimed invention requires essentially uniform sized macropores.

Accordingly, the claimed invention cannot be said to be anticipated or obvious over Peng et al. Therefore, applicants respectfully request that the rejection of claims 1-10 under 35 U.S.C. 102(b)/103(a) over Peng et al. be reconsidered and withdrawn.

Rejection under 35 U.S.C. 103(a) over U.S. Patent No. 6,024,899 to Peng et al.

Claims 39-52 were rejected under 35 U.S.C. 103(a) for allegedly being obvious over U.S. Patent No. 6,024,899 to Peng et al. The office action states that Peng et al. teaches the use of porogens to make carbon. The examiner states that Peng et al. does not teach the using a mixture of particles sizes to create the pore structure. However, the examiner contends that doing so is obvious.

The claimed method, as amended, is directed to a method of preparing a robust carbon monolith by providing a colloidal solution comprising a carbon precursor having a porosity-generating fugitive phase dispersed therein.

There is no disclosure or suggestion in Peng et al. to provide a colloidal solution. In fact, Peng et al. explicitly teaches away from a colloidal solution. See column 2, lines 62-65, which reads as follows:

... In other words, the pore former is solubilized completely and homogeneously to form a true solution (as opposed to other degrees of miscibility such as colloidal dispersions, etc.) in the carbon precursor ...

Therefore, from the above passage, it is clear that Peng et al. teaches away from a colloidal solution.

Thus, Peng et al. cannot be said to render the claimed invention obvious. Accordingly, applicants respectfully request that the rejection of claims 39-52 under 35 U.S.C. 103(a) over Peng et al. be reconsidered and withdrawn.

Rejection under 35 U.S.C. 102(b)/103(a) over U.S. Patent No. 6,515,845 to Oh et al.

Claims 1-10 were rejected under 35 U.S.C. 102(b) for allegedly being anticipated by, or in the alternative, under 35 U.S.C. 103(a) for allegedly being obvious over U.S. Patent No. 6,515,845 to Oh et al. The office action states that Oh et al. teaches a very

similar process and makes what appears to be the claimed carbon. The examiner points to the figures in Oh et al.

Applicants respectfully disagree. Oh et al. discloses a nanoporous carbon material having **2 to 20 nm pore size**. See column 3, lines 10-19 and column 6, lines 17-19. There is, however, no disclosure or suggestion in Oh et al. of a carbon material having essentially uniform sized macropores and a skeleton size of at least 100 nm.

In contrast to Oh et al., the invention is directed to a robust carbon monolith having a skeleton size of at least 100 nm and essentially uniform sized macropores and mesopores.

Accordingly, the claimed invention cannot be said to be anticipated or obvious over Oh et al. Therefore, applicants respectfully request that the rejection of claims 1-10 under 35 U.S.C. 102(b)/103(a) over Oh et al. be reconsidered and withdrawn.

Rejection under 35 U.S.C. 103(a) over U.S. Patent No. 6,515,845 to Oh et al.

Claims 11, 25-28 and 30-38 were rejected under 35 U.S.C. 103(a) for allegedly being obvious over U.S. Patent 6,515,845 to Oh et al. The office action states that Oh et al. teaches optimization of pore size. Thus, the examiner contends that adding meso and micro particles is an obvious expedient to create the desired pore sizes.

Applicants have amended claim 25 by replacing the word “mesopore” with the phrase “low-charring polymer.” Support for the amendment can be found in the specification as originally filed, see *inter alia*, paragraph [0078].

Oh et al., in contrast to the claimed invention, does not disclose or suggest a low-charring polymer. Rather, Oh et al. discloses silica beads for providing mesopores.

With respect to the rejection of claim 11, applicants have canceled claim 11. Therefore, the rejection is now moot and should be withdrawn.

Accordingly, the claimed invention cannot be said to be obvious over Oh et al. Thus, applicants respectfully request that the rejection of claims 11, 25-28 and 30-38 were rejected under 35 U.S.C. 103(a) over Oh et al. be reconsidered and withdrawn.

Rejection under 35 U.S.C. 103(a) over the References Above, individually, and taken with Taguchi et al.

Claims 12-24 were rejected under 35 U.S.C. 103(a) for allegedly being obvious over the references above, individually, and taken with Taguchi et al. Applicants have already addressed the rejection of the carbon monolith of the present invention over the references above. The disclosure of Taguchi et al. does not rectify the deficiencies in the above references.

Accordingly, application respectfully request that the rejection of claims 12-24 be reconsidered and withdrawn.

Rejection under 35 U.S.C. 112, second paragraph

Claims 81-11, 36-52 were rejected under 35 U.S.C. 112, second paragraph, for allegedly being indefinite for several reasons. First, the examiner states that claims 8, 9, 36 and 37 fails to limit the claims. Further, the examiner states that claim 11 is unclear. Applicants have canceled claims 8, 9, 11, 36 and 37. Accordingly, the rejection is now moot.

Lastly, the examiner contends that claim 39 is unclear for reciting the terms “mesoparticles” and “microparticles.” The examiner states that the term “meso” refers to pores, and not particles. Applicants have amended the claim to clarify the relationship between mesoparticles and microparticles. As amended, the claim now states that

removal of the mesoparticles and microparticles provides the carbon monolith with macropores and mesopores. Accordingly, applicants request that the rejection of the claims under 35 U.S.C. 112, second paragraph be reconsidered and withdrawn.

Support for Amendments to the Specification

Applicants have corrected the typographical error on paragraphs [0027] to [0032] on page 5 of the specification by replacing the term “mesopores” with the word “macropores.” The figure legends are now consistent with the definition of macropores provided in paragraph [0039] on page 6 of the specification as originally filed. No new matter has been added.

In view of the above amendments and remarks, allowance of the pending claims is earnestly requested. If the examiner has any questions or concerns regarding this amendment, he is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

/Edna I. Gergel/

Edna I. Gergel, Ph.D.
Registration No. 50,819
Agent for Applicants

UT-Battelle, LLC
P.O. Box 2008
Oak Ridge, TN 37831-6258
Tel. 865-574-0393
Fax 865-5740381